

On HF-Radio-Wave Induced Density Structures at F-region Altitudes and Their Dynamics - Observations with a Large Aperture Radar

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Small-scale structures in the mid-latitude F-region ionosphere created with HF-radio-wave pumping at 5.1 MHz have been observed with the Arecibo IS-radar. The Arecibo Heating system was operated at a 5 minutes on 3 minutes off cycle allowing thermal processes to reach steady-state conditions. The 450 MHz IS-radar was used with a random-coded long-pulse giving 25 MHz wide measurements of the full IS-spectra. This have made it possible to simultaneously identify the up and down-shifted natural and HF-excited plasma-line back-scatter. During HF-on power, with and central frequency of the natural plasma-line were significantly modified in several narrow regions from the bottom to the top of the F-region. In the modified regions there were a systematic decrease of the peak plasma-line power, a increase in spectral width of the plasma-lines, and shifts both towards higher and lower frequencies. In this presentation we will discuss the growth and dynamics of these structures.